

Patents, technology, and innovation in Jamaica and the British Atlantic before 1857

Patents operate on a global scale but are still largely administered at a national level. This was not always the case. Until 1852 any inventor taking an English patent had the option, for a small fee, to extend its operation beyond England, Wales and the town of Berwick-upon-Tweed to Britain’s colonies and plantations overseas. From 1716 to 1814 about fifteen per cent did so, and between 1846 and 1853 this rose to forty per cent. Supranational or imperial patents were thus becoming increasingly common in England at the very moment when a national patent system cut off this path of development, and had also interacted for over a century with the prizes offered by the Royal Society of Arts for ‘colonial’ inventions after 1754 and with a parallel system of colonial patents and grants. A mixed, multi-national economy of innovation therefore operated in the British Atlantic before 1857, which survived the American Revolution of 1776, and was centred on the colony of Jamaica as the leading colonial sponsor of technological development. New technologies entered the island or emerged from it through an interlocking system of imperial and colonial patents, grants and prizes which complemented each other and enabled the island to promote agricultural improvement. A close study of how and why this system worked therefore helps to reveal the ‘mixed economy’ of innovation in the British Atlantic and the factors supporting transnational technological diffusion in the first phases of the industrial revolution, while also offering an example of the global operation of a successful supranational patent system before 1852.

I. Historiography

The problems facing the modern patent system have been extensively noted. At a national level, the proliferation of ‘patent thickets’ can make it too difficult or even wholly uneconomic to develop new technologies, while the rent-seeking behaviour by ‘patent trolls’ can likewise block both the diffusion and improvement of existing technologies.¹ Where an invention cannot be patented for technical reasons or where legal protections of patenting are seen as weak, patents offer no incentive to the inventor, and in the eighteenth century this often led to alternative strategies of secrecy and concealment which also deterred diffusion and reinforced rent-seeking behaviour.² The importance of globalised trade since the late twentieth century has also helped to refocus attention on the limitations or problems that national patent systems face in striking the optimal balance between protecting the inventor and incentivising invention on the one hand, and enabling technological diffusion across national borders on the other, which might result in piracy where it is difficult to enforce compliance across multiple jurisdictions.³ Yet even today the global patent system remains a collection of national patent systems, and regional alliances such as the European Patent Convention and the African Regional Intellectual Property Organisation do not grant a single patent but rather a bundle of national patents

¹ See the summary in Encaoua and Madiès, ‘Dysfunctions’, 142-161.

² Bottomley, *British Patent System*, 106-169, 177-201; Dutton, *Patent System*, 69-81, 175-195; Encaoua and Madiès, ‘Dysfunctions’, 131-138; MacLeod, *Inventing*, 58-74, 97-114.

³ Trimble, *Global Patents*, 9-37.

which must be enforced in the traditional fashion.⁴ Even if the new EU Unified Patent Court Agreement comes into effect, it will create a unitary patent and patent court for the European Union which will then sit alongside both the existing European patent and the system of national patents. It is widely agreed that the profusion of different patent jurisdictions not only creates economic costs, through the need to conform to the differing requirements of those jurisdictions, but, as a result, disproportionately favours multinational companies in the developed world who alone have the resources to obtain the necessary coverage, thus helping to entrench many of the existing regional disparities within the world economy.⁵

The continued fragmentation of global patent jurisdictions reflects the fact that supranational patent systems are invariably based on the same model as national patent systems, where jurisdiction and sovereignty are co-extensive, which then raises contentious and often insurmountable issues of sovereignty and national interest. The first efforts to set up a European unitary patent began in 1975 with the Community Patent Convention, for example, and have repeatedly come to grief over the issue of national and inter-national rights.⁶ The historical experience of the

⁴ Bayliss, ‘Unitary Patent’, 433-475; Ellyne, ‘European Unitary Patent’, 57-78; Mupangavanhu, ‘African Union’, 1-24.

⁵ Barton, ‘World Patent System’, 341-357; Blakeney and Mengistie, ‘Intellectual Property’, 238-264; Encaoua and Madiès, ‘Dysfunctions’, 125-171; Trimble, *Global Patents*, 39-191.

⁶ Trimble, *Global Patents*, 9-37, 187-191. For a selection of proposals, see Abramowicz and Duffy, ‘Ending the Patenting Monopoly’, 1541-1612; Khoury, ‘End of the National Patent Office’, 197-238; McEniery, ‘The Time Is Nigh’, 167-202.

British patent system and its supranational component before 1852 suggests alternative models for organising patent rights in a globalised world. The abolition of this component in 1852 during the reform of patents was, in that respect, something of a backward step, consolidating the patent system in Britain but creating such legal diversity in the colonies – despite the example of the 1852 Act – that the Board of Trade noted in 1901, during negotiations to revive an imperial patent system, that the ‘extraordinary multiplicity of colonial patent laws ... [is] one of the most curious anomalies of the British patent system’.⁷ A study of how that system had worked before 1852 can therefore offer a new perspective on how a supranational patent system could, might, and did operate over a period of nearly 150 years.

Moreover, such a study helps to correct the overwhelming focus in most scholarship of invention and patenting on untangling the historical experience of innovation and diffusion at a national rather than supranational level. Most approaches towards the British industrial revolution, for example, focus on whether British technological innovation was the cause or consequence of economic change, and thus what the English patent system could or did not do to promote domestic invention and the diffusion and adaption of new technologies from elsewhere.⁸ Studies of the English patent system before 1852 by Henry Dutton and Christine Macleod have thus looked at the concentration of English patents in areas of local industrial innovation where

⁷ Bentley, “‘Extraordinary Multiplicity’”, 161-200; Wadlow, ‘British Empire Patent’, 311-346.

⁸ Allen, *British Industrial Revolution*; Berg, *Age of Manufactures*; Sullivan, “‘Age of Invention’”, 424-452. For a summary of this literature as it relates to patenting, see Bottomley, *British Patent System*, 11-20.

rewards for inventors and investors were highest.⁹ Only Sean Bottomley’s recent work has adopted a broader perspective, though still limited to Scotland and Ireland, showing how inventors employed rational strategies to maximise their rewards within this broader market.¹⁰ Joel Mokyr, Deidre McCloskey and others, who argue that the cultural resources of British society enabled and encouraged an ‘industrial enlightenment’ in which the patent system was largely irrelevant, likewise frame issues of technological invention and diffusion within a national sphere.¹¹

This has reduced the role of colonial territories such as the Caribbean or North America in the British industrial revolution to ‘walk-on’ parts, as the suppliers of resources, markets and capital for investment rather than as inventors in their own right or as participants in the process of innovation. The only exception is Nuala Zahedieh’s recent study of the English copper industry around 1700, which notes that ‘economic historians have treated activities on the colonial periphery as irrelevant ... to explanations of England’s growing technological capabilities, but ... the case of the copper industry [shows that] there were solid reasons for them being inextricably linked’.¹² This has not yet been followed up. Indeed, until relatively recently, there was considerable agreement about the overwhelming backwardness

⁹ Dutton, *Patent System*, 103-134; MacLeod, *Inventing*, 159-181.

¹⁰ Bottomley, *British Patent System*, esp. pp. 284-94; Bottomley, ‘Patenting’, 48-63, quotation on p. 59; Robinson, ‘James Watt’, 115-139.

¹¹ McCloskey, *Bourgeois Equality*; Mokyr, ‘Intellectual Origins’, 285-351; Mokyr, *Enlightened Economy*, 124-144, 255-178, 486-129.

¹² Zahedieh, ‘Colonies, Copper’, 805-825.

of the colonies in technological terms in the eighteenth century, in particular the plantation colonies of the Caribbean and the American South, which seemed to make them unpromising areas for analysing technological innovation. The literature on the history of the American patent system by Oren Bracha, Zarina Khan and others examines colonial patenting in North America before 1776 as a prelude to the United States Patent Office in 1790, with debates largely circling around the same questions of whether American patenting and innovation reflected a growing demand for technology or a growing supply of invention.¹³ Efforts to put this process into a transnational perspective by David Jeremy, Doron Ben-Attar and others have focussed mainly on transfers of technology and skills between the British and American national patent systems after 1790, and even the most sympathetic study of colonial patenting by Bruce Bugbee in 1967 concluded that it was ‘modest in its proportions and irregular in its course ... [and] of greater legal and constitutional than economic significance’.¹⁴

This perception of the technological backwardness of the colonies in general, and the plantation colonies in particular, has now been challenged by a series of studies which show that they were in fact highly open to innovation, since the intensive production and processing of sugar, rum, coffee, indigo and cotton required not just

¹³ Bracha, *Owning Ideas*, 12-31; Bugbee, *Genesis*, 57-81, 125-148; Khan, *Democratization of Invention*; Sokoloff and Khan, ‘Democratization of Invention’, 363-378; Walterscheid, *American Patent Law*.

¹⁴ Ben-Atar, *Trade Secrets*; Bugbee, *Genesis*, 82-83, Jeremy, *Transatlantic Industrial Revolution*, esp. pp. 50-91; MacLeod, ‘Paradoxes’, 885-910; Rosenberg, ‘Factors’, 3-33; Thomson, *Structures of Change*, 15-65, 129-159.

the brutal and inhumane exploitation of enslaved labour but also considerable technological investment, and delivered high profits which both incentivised and enabled inventions that promised even higher efficiency.¹⁵ Islands such as St Domingue and Jamaica possessed important pockets of scientific and technical expertise which enabled the widespread and early adoption of new technologies such as the steam engine and the hydraulic ram.¹⁶ However, the role of the British imperial and colonial patent system has not yet been examined fully. There have been several studies of the diffusion of the steam engine after the mid-eighteenth century, and a study of patenting in Jamaica between 1760 and 1830 by Veront Satchell has concluded that ‘technical inventions in both agricultural and manufacturing stages of the production process [of sugar] were the major strategies employed by planters’, with demand rather than supply driving innovation, though this study suffers from numerous shortcomings discussed in more detail below.¹⁷

Close study of this system, particularly as it operated in Jamaica between 1664 and 1857, demonstrates that it actually functioned on two complementary levels, divided by the powers they granted. An English or imperial patent merely registered a proprietary right to an invention for a set terms of years, enforceable in England and

¹⁵ Boomgaard and Oostindie, ‘Changing Sugar Technology’, 3-22; Burnard and Garrigus, *Plantation Machine*; Cateau, ‘Conservatism’, 1-36; Roberts, *Slavery and the Enlightenment*; Sheridan, ‘Changing Sugar Technology’, 59-93, and Zahedieh, ‘Colonies, copper’.

¹⁶ Deerr and Brooks, ‘Steam Power’, 11-21; Graham, ‘Falmouth’, 315-332; Satchell, ‘Steam for Sugar-Cane Milling’, 242-258; Tann and Breckin, ‘International Diffusion’, 541-564.

¹⁷ Satchell, *Sugar, Slavery*, 19, and pp. 165-194. For the steam engine, see above n. 16.

overseas at an English court. By contrast, colonial patents offered a much wider range of legal powers that were intended to facilitate the adoption of the invention and amounted in practice to an economic subsidy. Like the patents granted by individual American states between 1776 and 1791 studied by Camilla Hrdy, which operated alongside the federal patenting power established in 1787, these colonial patents were ‘individualised semi-contractual arrangements between the sovereign and the patentee ... to establish a working technology that produced beneficial results for the community’.¹⁸ Inventors could therefore adopt patenting strategies suitable to their circumstances, based on the relative advantages of the imperial and colonial patents in a mixed economy of innovation also populated by grants, rewards and prizes. Studies by Robert Burrell and Catherine Kelly have emphasised how these were used in Britain up to 1852 to reward and encourage inventors, or to help to promote the diffusion of particular technologies in ways not possible under the patent system.¹⁹ A close study of their colonial counterparts shows that they too were part of this wider imperial system of innovation. This paper will therefore be the first to reconstruct the transnational operation of the patent system, and will then show how inventors developed strategies to exploit it, before drawing wider conclusions about the supranational character of British and colonial patenting, and the rise and fall of the global patent system during the industrial revolution.

¹⁸ Bugbee, *Genesis*, 84-102, Hrdy, ‘State Patent Laws’, 45-113, quotation at p. 160.

¹⁹ Burrell and Kelly, ‘Public Rewards’, 858-887; Burrell and Kelly, ‘Parliamentary Rewards’, 423-449; MacLeod, *Inventing*, 183-200; Wood, *History*, 84-100.

II. Imperial and Colonial Patenting

The importance of the colonial market to imperial inventors, and the colonial patent system to local inventors, can be relatively easily quantified. At least 3,410 patents were issued in England between 1700 and 1813, of which 474 or 14 per cent were extended to cover the colonies and the plantations. Data are not available for the period between 1814 and 1846, but between 1847 and 1853 at least 1,092 out of 2,838 patents or about 39 per cent had a colonial clause (Table 1).²⁰ There were also 381 Scottish patents and 191 Irish patents issued between 1700 and 1813, mostly to English inventors, about 11 and 6 per cent of English patents respectively, though since a colonial clause was far cheaper than a separate Scottish or Irish patent these figures cannot be compared directly.²¹ Between 1847 and 1852, there were 1,134 Scottish and 334 Irish patents, about 40 and 12 per cent of English figures. Colonial patents were therefore about as important to English inventors as Scottish patents. Their importance, however, was much more volatile. The English, Irish and Scottish figures rose roughly in step between 1700 and 1852, whereas the colonial clauses peaked at 40 per cent in the 1750s, then fell precipitately, but had risen back to their previous peak by 1852. This suggests that the process was not automatic but that inventors were, to a greater extent even than Scottish and Irish patents, making calculations about the rewards they could expect by making a small investment in an

²⁰ The entries in Bennett Woodcroft's *Titles*, the standard reference for English patents, do not report consistently the geographical parameters of the patents issued between 1813 and 1846, and the only way to obtain a quantitative measure would be to check individually all 8,000 or so patents.

²¹ Sean Bottomley, 'Patenting', 48-63.

imperial patent. At least 94 colonial patents were also passed in the British Atlantic before 1780, two thirds of them in the West Indies and the rest in North America, mainly in South Carolina.²² A further 30 were made by individual American states from 1780 to 1791, when the federal Patent Office began operation, and at least 35 in the British West Indies until 1857. Patenting was therefore not widespread in the British Atlantic under colonial rule, but neither was it so marginal as to be irrelevant.

[Insert Table 1 here]

Some of these differences reflected the relative ease of patenting. In England, Scotland and Ireland they were granted by the Lord Chancellor and the process was one of registration more than anything else.²³ Patents lasted for fourteen years and might be sold, mortgaged or licensed like any other piece of property. The process generally cost about £100 and might take up to six months, but was also largely automatic. As noted above, it could be extended to British colonies and plantations, but to have legal force the patent had to be enrolled in the office of the registrar of deeds of each colony, and colonial infringements were only triable in English courts, at considerable cost to the patentee.²⁴ By contrast, in the colonies inventors had to

²² Based on patents mentioned in Bugbee, ‘Early American Law’, 140-203 and Bugbee, *Genesis*, 57-102.

²³ Sean Bottomley, ‘Patenting’, 33-72, Christine MacLeod, *Inventing*, 40-57.

²⁴ Parliamentary Papers 332 (1829), *Report from the Select Committee on the law relative to Patents for Inventions* (London, 1829), pp. 17-18, 48-50, 103

petition the colonial house of assembly for a private bill granting them a monopoly.²⁵ This was referred to a select committee who reported their recommendations to the house, who would then pass the patent as a private act. The process took several months and required anywhere between £30 and £100; Ralph Walker complained in 1788 that his two applications had failed ‘from an inability of the petitioner to pay the fees’.²⁶ As a piece of colonial legislation, the colonial patents were cognisable in their local court but not in England, and often came with several additional powers, but the process involved a higher level of scrutiny which likely deterred many colonial inventors, yet generated records that can be used to reconstruct it.

Since this procedure was relatively consistent across most colonies in the British Atlantic, the differences in colonial patenting most obviously reflected economic demand. Up to 1770, North American patenting was concentrated in South Carolina, a highly developed colonial economy based on the export of rice and indigo (Table 2). High profits had made South Carolina planters one of the richest groups in British America, and both encouraged and enabled them to invest not just in more slaves and land but also in new management techniques and mechanical innovations.²⁷ Hydraulic engineering produced tidal plantations with better access to irrigation, leading to higher yields, and prompted planters to explore ways to mechanise rice

²⁵ For the private bill procedure, see Bugbee, *Genesis*, 57; Hoppit, ‘Patterns’, 333-335, 340, 353-334.

²⁶ *Journals of the House of Assembly of Jamaica* [hereafter *Journals*] vol. viii, 437

²⁷ Bugbee, *Genesis*, 75-82; Chaplin, *Anxious Pursuit*, 134-165, 187-208, 228-168. For the wider role of technology in agricultural improvement, see Crothers, ‘Agricultural Improvement’, 135-167; Lerner, ‘Science’, 11-27; Sullivan, ‘Timing and Pattern’, 305-314 and above n. 15.

milling to remove the bottleneck caused by hand-milling techniques imported from West Africa.²⁸ Economic need therefore came together with a supportive assembly, controlled by the planters themselves, and a critical mass of technical expertise, to produce several patents in the 1730s and 1740s for mechanical mills, generating and reflecting what Bugbee has described as ‘a significant “patent consciousness”’. Even more patents were passed in the West Indies up to 1770, mainly in the two largest islands of Barbados and Jamaica, reflecting the far greater economic importance of this region, based on the production of sugar and coffee for export.²⁹ Planters were even richer than in South Carolina and were able to invest even more money in the purchase and management of slaves and adopting new technologies and processes for milling and distilling.³⁰ Colonial patenting was therefore concentrated in this period in major export economies which had the most to gain from improvements in productivity and could offer the highest rewards to inventors for their works.

[Insert Table 2 here]

This can be seen at a further level of detail by examining patterns of patenting across time as well as space. In South Carolina, patenting peaked in the 1730s and 1740s as the colony reached the limits of tidewater zones suitable for cultivation.³¹ Patenting

²⁸ Bugbee, *Genesis*, 82; Chaplin, *Anxious Pursuit*, 251-252.

²⁹ Sheridan, *Sugar and Slavery*, 415-475. For the wealth of Jamaica in 1774, see Burnard, *Planters, Merchants and Slaves*, 157-210.

³⁰ See above nn. 15 and 16

³¹ Chaplin, *Anxious Pursuit*, 252.

in Barbados was concentrated in the early eighteenth century as the island ran out of agricultural land and suffered soil exhaustion, leading to experiments in improving productivity that had resulted by the 1750s in a ‘capital-intensive, power-intensive system of agriculture conducted on a sustained-yield basis’, and gave moderate but stable returns of 3.4 to 5.6 per cent per annum for the remainder of the eighteenth century.³² The rapid expansion of the Jamaican economy after 1700 was initially sustained by the extension of cultivation into new land, resulting in profits as high as 14.8 per cent during the ‘harvest years’ of the mid-eighteenth century, but by the 1770s planters had exhausted all but the most marginal new lands and profits fell to 8.9 per cent before 1775 and 6.4 per cent in the 1780s.³³ As well as importing even larger numbers of slaves to replace those killed by the increased intensity of work, planters in Jamaica also tried to increase productivity through the better nutrition and management of their slaves, the adoption of superior agricultural techniques, and investment in new technology.³⁴ Satchell’s figures suggested that patents had

³² Sheridan, *Sugar and Slavery*, 138-147, 389-448; Ward, *British West Indian Slavery*, 48.

³³ Sheridan, *Sugar and Slavery*, 211-229, 447-275; Ward, *British West Indian Slavery*, 48 and the figures in Graham, ‘Colonial Sinews’, 198-202. In arguing that output was rising but profits were falling after 1775, despite a brief revival in the 1790s, I believe this reconciles the disagreements between Ragatz, Williams and Carrington, who have argued that the economy of the region began to decline after 1763, and Drescher Ward, Ryden, Reid and McCusker, who argue that it remained strong until 1807: Carrington, ‘American Revolution’, 823-850; Drescher, *Econocide*; McCusker, ‘British West Indies’, 310-330; Ragatz, *Fall of the Planter Class*; Reid, ‘Sugar, Slavery and Productivity’, 159-182; Reid and Ryden, ‘Land Markets’, 401-424; Ryden, *West Indian Slavery*; Ward, ‘Profitability of Sugar Planting’, 38-60; Williams, *Capitalism & Slavery*.

³⁴ Ward, *British West Indian Slavery*, 61-118, 190-232 and above n. 15.

an early peak in the 1760s and 1770s, and then another after the abolition of the slave trade in 1807, and he argued on this basis that these conditions ‘forced the Jamaicans to invent techniques aimed at increasing efficiency and productivity, thus enabling them to remain competitive in the sugar market’.³⁵ As in Britain, patenting and innovation was therefore tied to economic demand, tailing off in Jamaica from the 1830s as the end of slavery and new tariff regimes undermined the economy but then accelerating in Trinidad and British Guiana and Jamaica in the 1850s as the new plantations began to face soil exhaustion and the decline of the labour force.³⁶

Closer examination suggests that Satchell’s figures are not adequate on several counts, that the peak in patenting actually came in the 1780s, after a series of acute blows from the American Revolutionary War had further reduced profits, that the second peak he detected in the 1810s and 1820s was less significant, and that there was a brief revival in the 1840s and 1850s. For instance, his figures omit patents granted before 1760 and after 1830, or not connected with the sugar industry, as well as lumping together the patents with other petitions for grants and failing to distinguish between the successful and failed applications for patents. A more careful search of the journals of the Jamaican house of assembly between 1664 and the general patent act of 1857 reveals over 90 applications for patents, of which

³⁵ Satchell, *Sugar, Slavery*, 48-53, quotation at p. 53

³⁶ MacLeod, *Inventing*, 144-157. For the economies of Jamaica, Trinidad and British Guiana after 1830, see Eisner, *Jamaica, 1830-1930*, esp. pp. 163-70, 190-200, 236-84; Green, *British Slave Emancipation*, 191-260; Hall, *Free Jamaica*, 1-120; Ward, *British West Indian Slavery*, 233-260; Adamson, *Sugar without slavery*; Moohr, ‘Economic impact’; Stoll, ‘Thoroughly tested’.

more than 50 were successful, as well as over 40 other petitions for grants, prizes, bounties, subsidies and other forms of support for new technologies or processes (Table 3). Neither are these raw figures necessarily the ‘fair indicator of inventive activity in the island’ that Satchell has also claimed, not only because Macleod and others have shown that such figures are a reliable guide only to patenting rather than innovation but also because these figures require further disaggregation in order to understand the interplay between colonial patents and grants, and between colonial and imperial patents, which Satchell did not undertake.³⁷ What emerges from this process of disaggregation is a complex mixed transatlantic economy of innovation, where British, Jamaica and other inventors had a number of options open to them for profiting from their inventions, and used the complementary aspects of this supranational system to meet the demand for innovation.

[Insert Table 3 here]

III. Patent strategies

This was because patents in Jamaica offered a different set of advantages for both local and British inventors as compared with imperial patents. The latter offered a broad but limited set of proprietary rights, and had a low threshold for inventors, whereas colonial patents offered additional privileges intended to encourage the development and adoption of the invention, and inventors therefore had to show

³⁷ MacLeod, *Inventing*, 7, 144-157; Satchell, *Sugar, Slavery*, 49; Sokoloff, ‘Inventive Activity’, 813-820.

not only the novelty of their new technology but also its practicality and utility in order to secure the patent. For example, Francis Cooke petitioned the assembly in December 1768 that his new sugar mill would be ‘of infinite service to this country’, while John Ashley offered plans for his pumping engine in December 1793 and also a model, ‘by which it will be seen that the expence of erecting it is so inconsiderable, and its construction so simple that it is likely to prove of general utility’.³⁸ Where a model was not possible, petitioners often offered testimonials. Daniel Sedon found a new method of hanging coppers, for instance, and in December 1790 offered a plan and also ‘attestations ... from a great number of respectable planters, whom he has convinced of the utility and convenience of said invention’.³⁹ The committee examining the petition, composed mainly of planters with practical experience of the industry, could then make an assessment, and in some cases petitions were deferred for further information.⁴⁰ For instance, in December 1828 they heard from William Boyle McCulloch, who had developed a chemical process for making paint from the metallic ores discovered in the island.⁴¹ The committee reserved judgement until they had consulted with ‘Dr [Edward] Turner at London University or Mr [William] Faraday or another eminent chemist’, not just about whether the process was novel

³⁸ *Journals* vol. vi, 72, 302; vol. ix, 233

³⁹ *Ibid.* vol. viii, 605

⁴⁰ Satchell, *Sugar, Slavery*, 48-49.

⁴¹ The National Archives of the United Kingdom, London [hereafter TNA], CO 140/117 (*Votes of the House of Assembly* [hereafter *Votes*], 1829-30) p. 147-8, 237-8. Edward Turner (1798-1837) was professor of chemistry at London University, and had been born in Jamaica.

but also whether it was viable and useful, and decided that if so, McCulloch would be given both a patent and a grant to help develop a manufactory for it in Jamaica.

Indeed, in some cases utility rather than novelty was the defining criteria. The house heard a petition from Robert William Boussie in November 1785, for instance, that his father William learnt new methods for refining sugar in France in 1784 and written a treatise, with the help of Robert Murray and ‘that eminent professor of chymistry, Dr Joseph Black of Edinburgh’.⁴² Boussie and Murray had patented the process in England and become partners, and with support from several leading absentee planters Murray had left for Jamaica to license it to plantations in the West Indies. Robert William Boussie was his assistant but the two men fell out *en route*, and on their arrival in Jamaica they each asked the house for a patent for the same invention.⁴³ After a series of demonstrations the committee awarded the patent to Boussie, since Murray had been unable to produce any sugar using the new process, making it useless to the island.⁴⁴ The patent allowed Boussie to begin marketing the invention and adapting it to local conditions, leading to a further series of micro-inventions which were recognised and protected in a subsequent patent. ‘Many improvements ... adapted to the different situations and circumstances of the different parts of the island have suggested themselves to the petitioner’, he said,

⁴² *Journals* vol. viii, 104, 154, 157

⁴³ *Ibid.* vol. viii, 154

⁴⁴ *Ibid.* vol. viii, 104

‘which, from his not having been acquainted with such respective situations and circumstances upon his former application to the house, he could not then describe’.

As a result the colonial patent could be tailored to particular circumstances, and could provide provisional protection for an invention while it was made practical or perfected for wider dissemination. For example, when a free man of colour named John Lodge petitioned for a patent in December 1799 for his machine for grinding sugar canes faster, ‘that negroes need not as usual be worked so hard nor obliged to be up at nights, to the great danger of their healths, and consequently loss of interest to their proprietors’, he presented the house with a model of his design.⁴⁵ Two weeks later the committee reported that the principles of the machine were sound but that they had some doubts about whether it was practical. They therefore recommended that the assembly offer to Lodge a provisional patent for two years, with a full patent then to follow if he managed to construct a machine successfully, and a grant of £140 ‘in consideration of his being a cabinet-maker and having lost much time by his attendance on the house’. Nearly a third of Jamaican patents, about 20 in total, were separately patented in England, usually after they had first been patented in Jamaica, suggesting that the local patent provided colonial inventors with the chance to develop their technology in this way before undertaking the expensive process of securing an English patent and making arrangements for marketing it more widely.

⁴⁵ Ibid. vol. x, 389, 440

Since the purpose of a colonial patent was to ensure that the invention was useful, many Jamaican patents consequently also had licensing clauses which gave further security to local patentees in return for the rapid dissemination of the invention. For instance, Hugh King was one of the first petitioners for a patent, and in February 1734 he asked for a patent for his new mill ‘that others might not receive the benefit of his invention and charge’.⁴⁶ The house agreed but ordered that others might use the invention on paying a fee of £10. Samuel Sainthill was granted a patent in November 1778 for his new method of clarifying sugar, and when he died two years later his executor offered to license the process to planters.⁴⁷ Edward Peter Sergeant had a patent for his new cane mill in 1783 and offered licenses for £50, adding that ‘all persons are hereby warned against constructing or using the said new-invented mills without such license, as he is determined to prosecute the offenders’.⁴⁸ The house was even willing to help out when the licensing process failed. Boussie’s patent allowed him to receive 5s per hogshead of sugar from planters using his process, but he complained in November 1786 that he and his agents had only granted eight or nine licenses because, ‘by means of the enrolment of the principles and modes of invention, the same has become public and well-known’, despite the penalty of £200 for unauthorised use.⁴⁹ He duly received an updated patent which closely defined the procedure in order to facilitate prosecutions, and incorporated the various improvements noted above.

⁴⁶ *Journals* vol. iii, 223

⁴⁷ *Royal Gazette*, iii, 132, 27 October 1781, ‘Advertisement’

⁴⁸ *St Jago Gazette*, No. 1396, 16 to 23 January 1783, ‘To the public’; *Journals* vol. vii, 520

⁴⁹ *Journals* vol. viii, 187.

Inventors or introducers of new technology such as Boussie who secured a colonial patent in addition to their imperial one were therefore strategically exploiting a set of overlapping but complementary powers. Admittedly, most British inventors chose not to. Of the 474 English patents granted with a colonial clause between 1700 and 1813, only 16 were separately patented in the colonies, all but 2 in Jamaica. This was because foreign inventors had to undergo the same scrutiny as local inventors, even if they already held an English patent, which entailed both costs and delays. For instance, although Jean le Grand received an English patent in 1824 for his new methods for refining sugar and rum, and had been sent to Jamaica by the West India Committee of planters and merchants specifically to pass on and propagate his knowledge, the assembly insisted on referring his petition for a patent to several outside experts ‘who, from the nature of their studies and their experience, were supposed competent to judge of the information and capabilities of the petitioner’ and could confirm that the inventor and invention were fit to receive a patent.⁵⁰ Some felt that it was not worth the effort. The Falmouth Water Company offered to procure a patent for Boulton and Watt in 1799 for their hydraulic ram, for example, but the partners turned this down since they concluded that the island did not have any large ironworks that were capable of pirating this new technology, ‘[so] we are not apprehensive of rivalry’.⁵¹ As with the international marketing of their steam engines, the colonial patent was not seen as necessary, but there clearly were a

⁵⁰ Ibid. vol. xiv, 393, 466

⁵¹ Graham, ‘Falmouth’, 332.

small number of inventors who had particular circumstances which made the powers of a colonial patent a useful part of their strategy for overseas dissemination.⁵²

For example, in the case of Robert William Boussie, it not only gave him priority over Robert Murray but also gave him additional legal powers for licensing and enabled him to incorporate several improvements into the second patent.⁵³ The London merchant John Innes had purchased John Hague’s English patent for an improved method of making molasses, and his agent in Kingston duly applied for a patent in November 1830, stating that he had made some further improvements and it would ‘be necessary for him to obtain the aid of the legislature of this island to enable him to enjoy the advantage of such invention’, as the English patent might now have been superseded.⁵⁴ Perhaps the most important advantage that a colonial patent also offered was the ability to prosecute infringements of the imperial patent in local courts as well as in England. Several of the petitions to the assembly from English inventors made this point, especially in the 1830s and 1840s. The Irish inventor of the continuous still, Aenaes Coffey, held an English patent, for example but visited the island in November 1842 to ask for a colonial patent as well, ‘[being] advised and believ[ing] that a patent is requisite for protecting [his] rights ... and to enable him, with a due regard to such right, to render his knowledge of advantage to all persons who may feel disposed to avail themselves thereof, on fair and reasonable terms’.⁵⁵

⁵² Tann, ‘Marketing Methods’, 363-391; Tann and Breckin, ‘International Diffusion’, 541-564.

⁵³ *Journals* vol. viii, 187-8

⁵⁴ TNA, CO 140/119 (*Votes*, 1830-1) p. 85

⁵⁵ TNA, CO 140/134 (*Votes*, 1842) pp. 133-4

As in Britain, the colonial patent was also only the first stage in a much wider ‘trade in inventions’ between the inventor, investor, entrepreneur and end-user.⁵⁶ For example, the choice by Sainthill’s executor to license his process for clarifying sugar was a last resort, since Sainthill had intended to profit by selling and installing the necessary equipment. ‘Where it has been accurately executed, every person’s expectation has been exceeded, but [where] on the contrary, disappointment’, he advertised in the *Jamaica Mail*, ‘... [so] he will undertake the workmanship himself, and as he will not be able to perform the engagements already made ... he will enter into partnership with any good mason who has tradesmen of his own’.⁵⁷ Boussie asked for his revised patent to address the problem of piracy, for example, but also admitted that he was nevertheless profiting by selling his technical expertise to planters.⁵⁸ ‘Notwithstanding such promulgation and general notoriety of the principles and mode of process of the said invention’, he stated, ‘many of the most respectable planters of this island have considered the petitioner’s personal exercise of such invention upon their respective estates as necessary for the instruction of the persons employed by them in making sugar’. Under these circumstances, the colonial patent probably served to reinforce the existing rights of the imperial patent, as well as strengthening his claim to specialised knowledge and thus putting the inventor or patentee in a strong position in his negotiations with customers.

⁵⁶ Bottomley, *British Patent System*, 202-228; Dutton, *Patent System*, 108-142; MacLeod, *Inventing*, 139-143.

⁵⁷ *Jamaica Mail*, vi, 5 June 1779, ‘Advertisement’

⁵⁸ *Journals* vol. viii, 187-8

Colonial and imperial patents were thus complementary parts of a supranational patent system between 1640 and 1852, resembling the relationship between the federal and state patents in America in the 1790s, which offered an important level of flexibility for Jamaican inventors in a transatlantic process of invention and exploitation. For instance, Isaac Lascelles Winn developed a steam engine for better refining of sugar and the production of salt and distilled water, ‘highly beneficial to this island, especially in time of war ... where there is a scarcity of that element’, and after a failed attempt in November 1787, he obtained a patent the following year which let him to collect premiums for licensing the process.⁵⁹ He obtained a second patent in November 1789, ‘the petitioner, by much study and many experiments, [having] discovered or invented methods of effecting those important objects to a greater degree’, having also sent the design to his sister in England who secured a patent in June on his behalf.⁶⁰ For British inventors who wanted to add further protections to their imperial patents, the colonial patent thus served as useful purpose. Several early inventors from Barbados even ignored the imperial patent entirely and applied for patents from Barbados, Antigua, Jamaica and St Kitts, obtaining additional protections without the inconvenience of travelling to London.⁶¹

⁵⁹ Ibid. vol. viii, 319, 424-5, 518

⁶⁰ Ibid. vol. viii, 518; Woodcroft, ed., *Titles*, 309.

⁶¹ They were Rudhall Russell, Thomas Sainthill and Thomas Spencer: see *Acts of Assembly Passed in the Island of St. Christopher from the Year 1711 to 1769*, 91; Hall, ed., *Acts Passed In ... Barbados*, 502, 504, 512, 515; *Journals* vol. iii, 357, 374, 383; *The Laws of the Island of Antigua* vol. i, 202, 206

A multi-layered or ‘tiered’ patent system thus gave inventors flexibility to tailor patents to their individual needs, facilitating the process of technological diffusion.

IV. Patents and Grants

However, a comprehensive understanding of how these two levels of patenting in Jamaica interacted can only come from an examination of their broader context, in which patents were only one part of a wider system of colonial measures. These included a number of bounties, subsidies and prizes, but by far the most common alternative to patenting was to provide grants of money to inventors in return for them releasing details on their invention to the public.⁶² As noted above, recent work has highlighted the flexibility which the grant offered to inventors, providing immediate rewards and allowing rapid diffusion of an invention or idea, although the real importance of the practice has also been strongly contested on the basis that little evidence can be found for their effectiveness.⁶³ Looking at patents and grants in parallel in Jamaica show that the two were used strategically by both inventors and the assembly, to encouraged the spread of new technologies within the island.

Between forty to fifty applications were made for grants between 1767 and 1857, depending on what criteria are used and including petitions which asked for an unspecified ‘encouragement’ or ‘relief’ but did not result in a bill for a patent. For

⁶² Hall, *Free Jamaica*, 121-76

⁶³ Khan, ‘Inventing Prizes’, 631-660.

reasons that are still not clear, they followed a different pattern to the colonial patents, occurring every one or two years from the 1780s through to the 1830s; one inventor noted in 1787 that in recent years ‘sundry persons attempting to serve the public have received considerable bounties and large gratuities, both from the public funds and private subscriptions’.⁶⁴ Petitioners had to go through the same rigorous process for a grant as a patent and demonstrate the novelty, utility and viability of their invention. The first grant of £50 was made to the botanist and naturalist Dr Anthony Robinson in December 1767, for example, for publishing a procedure for making soap from local plants, which he claimed would provide work for aged and inform slaves and allow ‘all such lands, which at present lie useless and uncultivated ... [to] become extremely valuable to this community’.⁶⁵ A Loyalist refugee named John Hunter received two grants of £300 in 1783 and 1785 to set up a potash manufactory using a technique brought from America, which would then supply another useful export for the island.⁶⁶ The committee duly consulted several local experts about the case for potash manufacture, Hunter’s credentials, the quality of his samples and the practicality and reliability of his new process.⁶⁷ When Charles Blackford asked for a grant in February 1801 for his method for purifying sugar, the committee examined it in operation on two nearby estates before they

⁶⁴ *Journals* vol. viii, 322

⁶⁵ Burnard, *Mastery, Tyranny and Desire*, 102-104, 119; *Journals* vol. vii, 558; vol. viii, 124-5, Long, *History*. vol. ii, 135-6

⁶⁶ *Journals* vol. vii, 558-9, 560; vol. viii, 124-5, 144, 160. For potash, see Roberts, ‘American Potash Manufacture’, 383-395; Paul Warde, ‘Trees, Trade and Textiles’, 47-82.

⁶⁷ *Journals* vol. vii, 558-9, 560; vol. viii, 124-5, 144, 160

concluded that it was ‘of great public utility’ and granted £250 ‘as an encouragement for such laudable endeavours, as well as an acknowledgement of the important improvement ... which he has evinced to the satisfaction of the committee’.⁶⁸

Since a patent cost the assembly nothing but a grant involved public expenditure, petitioners also had to justify their request, making it possible to reconstruct the strategies they used and choices they made. A common argument was that chemical and biological processes were difficult to define and the patents almost impossible to enforce, and that grants provided the rewards necessary to recognise merit and encourage other inventions.⁶⁹ Another argument was that the invention was so easy to pirate that the inventor would otherwise have no incentive for make it public. Thus, John Humber received £450 in 1839 from the legislature for publishing his plan for a machine for processing coffee beans.⁷⁰ ‘On account of its economy and efficaciousness, it will tempt persons constantly to infringe on the patent right of the inventor, [and] as no enactment can guarantee him against this piracy, he has no recourse but in the liberality of the legislature’, the committee told the house, and concluded that ‘by purchasing out his patent rights and throwing the invention open at once to the public, the colony will be unrestrictedly benefitted, and the ingenious inventor duly rewarded’.⁷¹ Grants could thus help to encourage innovation by rewarding inventions that were not suitable for patenting. They could also support

⁶⁸ Ibid. vol. x, 529, 567

⁶⁹ See above pp. 2

⁷⁰ TNA, CO140/130 (*Votes*, 1839-40) pp. 115-16, 121, 125, 255-6

⁷¹ TNA, CO140/131 (*Votes*, 1840) pp. 101-2, 106-7, 299

inventors who could not make use of either a colonial or imperial patent, helping to cover what were, at least among English inventors, often heavy costs of research and development, and thereby facilitating technological innovation within the island.⁷²

For instance, Blackford applied for a grant because he was ‘so circumstanced that he cannot carry his model into execution without the aid of the house, for the benefit of the public’. Hugh Greaves offered his plan for a cattle mill in October 1807 in return for a grant, ‘[as] the petitioner hath been deprived of his sight for many years, and is now almost blind, and his circumstances will not admit of his applying to the house for a patent for erecting mills upon the said model’.⁷³ The house heard a complaint from the carpenter and millwright Anders Jensen Schouberg in November 1822 that his plan for a horizontal cane mill had been ‘pirated’ [sic] by William Anderson Orgill, a planter to whom he had lent a model of it a year before.⁷⁴ Schouberg also added though that he was in no condition to promote the mill himself, being ‘in very moderate circumstances, and with a wife and four children who are dependent on his exertions’, and asked the house for a grant rather than a patent. Finally, the assembly received a petition in March 1832 from a planter in Antigua named John Hanmer Baker, who offered a new method of refining sugar, and testimonials from the governor there in support of it.⁷⁵ Rather than go to the trouble of securing a patent in each colony or in London, he simply offered his invention to the house and

⁷² Bottomley, *British Patent System*, 266-279; Dutton, *Patent System*, 155-168.

⁷³ *Journals* vol. xi, 576

⁷⁴ *Ibid.* vol. xiv, 9, 56

⁷⁵ TNA, CO 140/121 (*Votes*, 1831) p. 63, 69

requested that if they found it useful, ‘the petitioner leaves it to the generosity of the house to award him such remuneration as they deem meet’.

The reward or grant therefore supported innovation by correcting gaps within the patent system and rewarding local inventors who might not otherwise have brought forward their inventions, and as a result it is possible to see colonial inventors moving strategically not just between colonial and imperial patents but also between colonial patents and grants, depending on their circumstances, in order to obtain the best rewards.⁷⁶ John Greenhill Yonge secured a colonial patent in 1762 for his new sugar mill, for example, but later obtained an English patent – with a colonial clause – in November 1766 for his ‘hydraulic machine’ and then applied for a Jamaican patent for it in December 1773 for additional protection. The committee inspected a model he had erected at his house in Kingston, found it practical and useful, and reported that he deserved the patent.⁷⁷ However, when Yonge developed a new chemical process for making fireproof tiles from artificial stone in 1783 and proposed to develop this as a business, he applied for a grant, ‘[as] in order to render the manufacture of said tiles of general use to the island and profitable to himself, the petitioner must incur a heavy expence for the necessary apparatus etc. much beyond his present ability’.⁷⁸ Peter Edward Sergeant similarly received a patent from the house in December 1783 for his new sugar mill.⁷⁹ He came before the

⁷⁶ See above n. 19.

⁷⁷ *Journals* vol. v, 372; vol. vi, 468, 476

⁷⁸ *Journals* vol. vii, 623, 637

⁷⁹ *Ibid.* vol. vii, 520; vol. x, 591; vol. xi, 448, 539

house again in 1801 and 1806 with some improvements but asked this time for a grant, explaining that he was 54 years old, disabled and unable to develop it properly, and the house duly awarded him £500. However, five years later he petitioned the house again, for a new method he had found of tanning leather, and requested either a grant or a patent from the assembly.⁸⁰

The same was also true of the assembly itself. When William Roach developed a machine for pumping water he asked in November 1788 for a grant of money, ‘[as] the public disclosure thereof will deprive the petitioner of all benefit of his discovery, from the certainty of its being immediately imitated and becoming the general mode of raising water’.⁸¹ The committee were not convinced and he was given a patent instead, and soon placed advertisements in the *Cornwall Chronicle* offering licenses to planters for £5 each.⁸² On the other hand, if the house felt that an inventor did not have the capacity to make their invention useful and practical, it might vote a grant to the inventor to encourage further research, as in the case of John Lodge, or even buy out their own interest entirely. For instance, Jean Baptiste Brouet asked the house in December 1799 for a patent for a machine for curing coffee he had brought from Saint Domingue.⁸³ This was a propitious moment, as coffee cultivation was expanding rapidly in the island to fill the gap in world coffee markets left by the

⁸⁰ Ibid. vol. xii, 526

⁸¹ Ibid. vol. viii, 448

⁸² *Cornwall Chronicle*, 7 Feb. 1789, Advertisement

⁸³ *Journals* vol. 388-9, 466

slave revolt in Saint Domingue.⁸⁴ The committee all agreed that Brouet’s machine was useful, ‘but as the petitioner has not been naturalised and is totally unable to pay the fees for a private bill’, they suggested granting him £350 instead, ‘as a full reward for his invention; [and] the machines constructed according to the model whereof may then be used by any person desirous of the same without any license from or fee paid to the petitioner.’⁸⁵ Colonial patents and grants therefore fulfilled complementary roles, and, as the next section will make clear, interacted in turn with imperial patents to support the spread of technology to the island from abroad.

V. Inventors and inventing

Examining the full range of options open to inventors and the language which they used to access these options also makes it possible to explore how this complex, multi-layered system supported inventors as well as inventions by providing the mix of incentives needed to stimulate and facilitate imperial and colonial innovation. By shifting the perspective from the institutions which supported them to the inventors themselves, it becomes possible to assess the relative importance of institutions, on the one hand, and of cultural and human resources, on the other, in the pursuit of technological innovation upon a global scale.⁸⁶ This section therefore returns to the issues raised at the start about the national focus of most studies of technology,

⁸⁴ Smith, ‘Sugar’s Poor Relation’, 68-89.

⁸⁵ *Journals* vol. x, 466, 467

⁸⁶ For a focus on inventors, see MacLeod, *Heroes of Invention*.

innovation and patenting by showing how globalised many of these inventors were, moving back and forth between colonies and the metropole.⁸⁷ The supranational patent system was a precondition for this process.

For instance, the linked system of patents and grants in Britain and Jamaica shows that about 75 per cent of inventors in Jamaica were either from the island or were long-term residents there, while 13 per cent had either arrived recently from Britain or were applying for a patent through their agent, and the remainder were from elsewhere (Table 4a-c). About 52 percent of the inventors who offered their profession or status were planters or gentlemen; 12 percent were a merchant or major businessman; 18 percent were a professional such as doctor, engineer or chemist; and 19 percent were tradesmen or artisans, including 12 millwrights, who tended to be highly skilled in practical and mechanical engineering.⁸⁸ These were about the same proportions as in England.⁸⁹ The patents and grants confirm Satchell’s surmise that innovation in Jamaica was dominated by the demands of the plantation sector, especially sugar; that the focus of invention switched from mechanical improvements to milling to chemical improvements in distilling around 1800; and that the first mainly arose from local planters and artisans whereas the second tended to be granted to foreign inventors with scientific training.⁹⁰ As Macleod has cautioned, such figures may suggest little about the actual sources of

⁸⁷ MacLeod, *Heroes of inventing*.

⁸⁸ MacLeod, *Inventing*, 109, 118, 137; Mokyr, *Enlightened Economy*, 109-110.

⁸⁹ MacLeod, *Inventing*, 134-139.

⁹⁰ Satchell, *Sugar, Slavery*, 50-71, 85-100.

innovation, since there were no doubt many inventions which were never formally recognised, and others which were stolen by the patentees from the slaves or artisans who invented them – as in the case of Anders Jensen Schouberg – but they do set a lower bound which confirms that invention and patenting was not limited to the elite.⁹¹ As in Britain and the United States, even artisans and tradesmen were prepared to apply for some sort of reward. At least two petitioners, John Lodge and Dugald Clarke, were free people of colour, though this probably suggests nothing more than that the planters and merchants of the island were cynical enough to temporarily set aside their racial prejudices when the chance of profit was involved.

[Insert Table 4a-c here]

The mixed economy of innovation therefore support patenting from a wide range of social classes and, in particular, from a wide range of places.⁹² Robert William Boussie’s father had obtained the new process for refining cane juice in Paris, for instance, but had patented it in London, where he secured testimonials from various absentee Jamaican planters, and had then sent it to Jamaica for a further patent and for commercial exploitation.⁹³ John Hunter had imported from North America his knowledge of potash manufacture, and Jean Baptise Brouet likewise brought over from Saint Domingue his new stove for drying coffee, which he had developed after

⁹¹ MacLeod, *Inventing*, 115-143; Veront Satchell, *Sugar, Slavery*, 66-68.

⁹² A point made in Satchell, *Sugar, Slavery*, 60-64.

⁹³ See above n. 2

seeing ‘the success of stoves in curing clayed sugars’, providing an example of an invention jumping not just from one place to another but also from one industry to another in response to market forces, as Jennifer Tann has studied.⁹⁴ As earlier sections have shown, there was also an interchange between Britain and Jamaica, with British inventors developing various inventions and coming out to Jamaica to exploit them, and the Jamaican inventors perfecting them locally before moving on to bigger markets. Before sending off his steam engine to Britain, for example, Isaac Lascelles Winn informed the house that he ‘hath not only made many experiments himself ... but hath also been the occasion of several ingenious men applying their studies to the same subject, whereby the public ... hath been benefited.’⁹⁵

In other cases the British connection provided the important technical expertise that Jamaican inventors needed in order to translate their vision into reality. Francis Cooke ‘invented and got from England at great expence friction wheels of an uncommon and entirely new construction’, for example, which would make his cattle mill for grinding sugar canes even more effective, and applied for a revised patent in 1770 on this basis.⁹⁶ British patentees also benefitted from the skills of local artisans and mechanics who could help adapt inventions to local conditions and resources. As noted above, Robert William Boussie declared that he required a second patent in 1786 because of improvements made since coming to the island.

⁹⁴ *Journals* vol. x, 388; Tann, ‘Borrowing Brilliance’, 94-114.

⁹⁵ *Ibid.* vol. v, 255

⁹⁶ *Ibid.* vol. vi, 302. See also the example of Edward Woollery: Edwards, *History*. vol. ii, 263 and *Journals* vol. vi, 350, 550

Adopting the hydraulic ram required the directors of the Falmouth Waterworks Company to work with local engineers, artisans and mechanics to adapt the ram to local conditions and to repair it when the iron valves broke, as they frequently did. ‘Having very good tradesmen on the spot we have been enabled to repair some of them’, the directors told Boulton and Watt in 1804, for instance, ‘and have been advised to replace the iron valves with strong brass ones, which are already cast but not yet put on’, testifying to a process of experimentation which helped planters and manufacturers to decide whether to market the invention more widely.⁹⁷

Finally, as a result of this transatlantic linkage, as the supranational patent system can under close scrutiny in the 1850s, the value of the system for Jamaica likewise came to be questioned. In the same way that the imperial application of British copyright law in 1814 was not the result of a carefully-worked out imperial strategy but reflected a ‘considerable element of arbitrariness’, the retreat from an imperial patent law in 1852 was unplanned and a product of very specific circumstances, as Moureen Coulter in particular has emphasised.⁹⁸ British sugar-refiners took the lead in such debates during the 1850s, arguing that their colonial competitors were undercutting them with pirated technologies and that patents should be abolished to create a level playing field in a sector that was already exposed to competition

⁹⁷ Graham, ‘Falmouth’, 322.

⁹⁸ For copyright law, see Barnes, *Authors, Publishers and Politicians*; Bentley, “‘Extraordinary Multiplicity’”, 169-187, quotation on p. 194; Seville, *Internationalisation*.

from foreign planters in Cuba and Brazil.⁹⁹ West Indian planters likewise complained that they in turn were being undercut by these foreign planters, who had cheap slave labour and were also paying lower prices for pirated British technologies. The multi-national patent system was therefore breaking down in the 1850s, as the spread of technology outside the British Empire placed new pressures on what had been a self-contained system. Rather than try to salvage and reform the colonial clause, the landmark 1852 Patent Act in Britain abolished it entirely, leaving each colony to pass their own law and contributing to the disorder which the Board of Trade tried to reverse with a resurrected British Empire patent in 1901.

The collapse of the supranational patent in Britain in 1852 therefore did not reflect a considered and careful analysis of its various impacts on technological innovation and diffusion, but was the product of self-interested lobbying by a small group of sugar planters and refiners who transmitted their views to Jamaica. Parroting the views of his council, the governor told the Colonial Office in 1853 that patents had

⁹⁹ Coulter, *Property in Ideas*, 50-92, 167-180; Dutton, *Patent System*, 34-65. This emerges from the responses given to the 1851 Patent Committee: see PP 486 (1851), *Select Committee of the House of Lords to consider bills for amendment of the law touching letters patent for inventions: reports, minutes of evidence* (London, 1851) pp. 18, 42-5, 65, 98, 145-54, 196, 269-70, 281, 305-6, 318, and the evidence collected by the Colonial Office in *See Abstract of replies [in 1853] ... on the subject of the extension of patents for inventions to the colonies* (London, 1859) and *Abstract of replies [in 1856] ... calling for information as to the form of the application to be made by persons desirous of obtaining patent rights in the colonies* (London, 1861). For the economic situation, see above n. 36.

‘done as much harm as good’ and should be replaced by public rewards.¹⁰⁰ Jamaica and Barbados each passed acts in 1852 requiring British patentees wishing to enforce their patent in the islands to secure a further local patent, confirming the breakdown of the imperial patenting system.¹⁰¹ When the Jamaica Society of Arts was set up by the planters in 1854 it also embodied this new attitude, declaring that it would arrest the economic decline of the island by using grants to help develop a new industry for processing plant fibres.¹⁰² A patent for this process in 1855 failed to pass the house, indicating a growing level of hostility to both imperial and colonial patents.¹⁰³ A committee of the Society met in 1857 to examine the patent laws in Jamaica, for instance, and recommended that they be reformed along English lines ‘to evoke that spirit of competitive ingenuity and encourage that originality of conception which are found to exist in a greater or less proportion among all classes of men’, but on a purely national basis, and with additional local clauses ‘to guard the public against spurious or unworthy claims’ and audit the petitions of foreign inventors to check ‘the novelty, utility and originality of such specifications ... [and] to guard against foisting on the community stale and exhausted inventions’.¹⁰⁴ The imperial patent system therefore broke down in 1852 after it was assaulted at both ends for what were ultimately narrow and self-interested reasons, leading to its

¹⁰⁰ *Abstract of replies [in 1853]* p. 28

¹⁰¹ *Abstract of replies [in 1856]* pp. 28-30; *Colonial Standard and Jamaica Despatch*, iii, 107, 19

November 1852, ‘Proceedings of the Assembly’

¹⁰² *Transactions of the Jamaica Society of Arts* (1856) ii, 1-2, 7-8.

¹⁰³ TNA, CO 140/153 (*Votes*, 1854-6) pp. 248-50, 415, 423, 430, 449, 460, 465, 478

¹⁰⁴ *Transactions of the Jamaica Society of Arts* (1856) ii, 34, 37, 42; Coulter, *Property in Ideas*, 100-135.

decomposition into a more limited series of parallel national systems through the passage of acts such as the Jamaica Patent Act of 1857, which still remains in force today and provides the basis of Jamaica’s intellectual property law.¹⁰⁵

VI. Conclusion

Existing solutions to the problems of global patenting take for granted the automatic linkage between a patent and its jurisdictional sphere, embodied by the American and French patent acts of 1790 and confirmed by the final removal of the imperial link in the British patent system after 1852. The world is seen as a collection of ‘parallel’ national patent regimes, with a unitary or global patent to be achieved through the complex process of merging or superseding these individual patent regimes and finding an acceptable means of enforcement which does not threaten national sovereignty, which is why so many plans have fallen by the wayside. The operation of the British imperial and colonial patent system before 1852 suggests an alternative means of organising a global patent system, on the basis of ‘tiered’ rather than ‘parallel’ national regimes. Innovators in both Britain and Jamaica faced numerous challenges in profiting from their inventions, and a system of national patents would not have suited either the inventor in Britain seeking a degree of protection when marketing the technology overseas, or the inventor in Jamaica looking for support for their new invention. A tiered or multi-layered system of

¹⁰⁵ Jamaica Act No. 283 (1857), ‘Patent Act’; TNA, CO 140/156 (*Votes*, 1857) pp. 98, 183, 206-7, 216,

patenting allowed British inventors to secure a basic patent by mere registration in Britain, which recognised their rights to their invention, and to obtain a more generous and extensive patent from any of the individual colonies if they required additional protection and support to help make it workable. It also allowed colonial inventors to protect their invention locally as they developed it for the British market, while offering additional powers to help make it profitable and practical in the local market. The powers given were greater, so the level of oversight and examination was also higher, but it is clear that quite a number of British and Jamaican inventors felt that this was an acceptable trade-off.

Especially when combined with further mechanisms for rewarding innovation, such as the grant, reward, subsidy or prize, the result was therefore a mechanism within Jamaica which seems to have served both to promote local innovation and to help encourage the introduction and adaption of outside technology and techniques. The pattern of patenting, in Jamaica in particular and the British Atlantic in general in this period, suggests that economic incentives ultimately drove this process. Colonial patenting was concentrated in rich plantation colonies producing profitable export crops, and in sectors such as rice in South Carolina and sugar and coffee in the Caribbean which offered the best rewards to inventors and investors, and usually at the stage when colonies had exhausted all but marginal land and were shifting from extensive to intensive agriculture in order to maximise yield through increased productivity. Patenting and invention were thus one aspect of a growing demand for economic improvement. A workable system of imperial and colonial patents and grants did not generate this process, but it clearly helped to support it. Imperial and

colonial patents and grants, in other words, were complementary parts of a system of innovation in the British Atlantic driven by its economic growth.